Industrial Engineering
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Module - 4
Lecture - 17
Value Engineering

A very warm welcome to all of you in this lecture on Value Engineering. In the series of lectures we have been covering very diverse topics related to industrial engineering. We have covered a plethora of topics and today's topic is Value Engineering. Value Engineering is: gaining much more significance in the present scenario because of a lot competition among the various companies.

In a monopolistic type of business environment, where only one company is manufacturing a single type of a product or the company has a monopoly of that particular product in that particular segment. Then there is no need to study all this different aspects of Industrial Engineering, but in present scenario where for a single market segment. There are so many companies who are trying to increase their market share over a period of time the concept of Value Engineering comes into picture.

What is Value Engineering? What do we mean by value? What do we mean by function? All these things we are going to cover in today's lecture. We can also foresee that most of the times a company launches a product. The price to acquire, that product it at the type time of launch is considerably higher. But over a period of time we feel that the prices of that particular product instead of increasing they are coming down.

So, is the company selling at loss? So, no company is going to sell at loss. Each and every company is going to make profit, but with the advent of new materials with the advent of new technologies with the invention of newer and newer methods of processing. The company is able to reduce the cost of their products over a period of time. And what does this means this is the basic concept of Value Engineering? So, in today's lecture we would see, How Value Engineering emerged?

And we would, also see that if you have to put Value Engineering into practice. Then, how we should go about it? What are the various steps that we have to take into account? When, we are going to plan out a Value Engineering program in our organization? It has

been seen that Value Engineering if applied, systemically has been resulted into a huge amount of profit. So, let us now start our discussion related to the basic concept of Value Engineering. How this presentation is going to unfold? First of all we will see the theory of Value Engineering.

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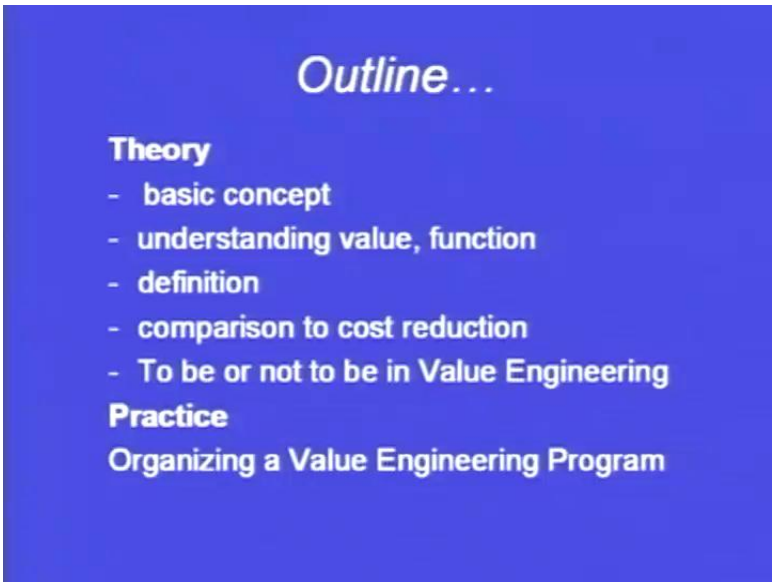

That what is the basic concept? We will try to understand the word value. We would try to understand the word function. What do we mean by value? What do you mean by function? And then we will have definitions given for Value Engineering. We would have a 1 line definition we which would clearly, make the observers or make the listeners quite conversant with the basic definition of Value Engineering.

Then, we will have a comparison to cost reduction. Because some people may have this notion that Value Engineering is something which we call as cost reduction, but there is always a marked difference between the two. Cost reduction is entirely different from Value Engineering. How it is different that we are going to cover in today's lecture? Similarly, some of the companies they understand that yes, Value is Engineering is very important.

We should think of adopting Value Engineering, but they have so many excuses that yes. This excuse number 1, excuse number 2, excuse number 3. That we do not want to adopt Value Engineering. So, but all these myths we will see that why companies are not adopting Value Engineering? What excuse is they have to put for not adopting the

concept of Value Engineering? Then, we will see the practice part: that is organizing the Value Engineering program.

So, the complete presentation is divided into 2 broad categories: The first category is related to the theory in which, we are going to consider the definitions and the understanding the basic concepts of value and function. And in the second particular a part of the presentation we are going to see that, if we are organizing the Value Engineering program. What are the various steps that we have take into a account?

So, let us without wasting much time, let us focus directly on the theory of Value Engineering. Let us start the discuss with these 2 important points. That money is of no value, it cannot spend itself all depends on the skill of the spender. So, in order to have a value of the money everything depends upon the skill of the spender; Ralph Waldo Emerson has coated this particular point.

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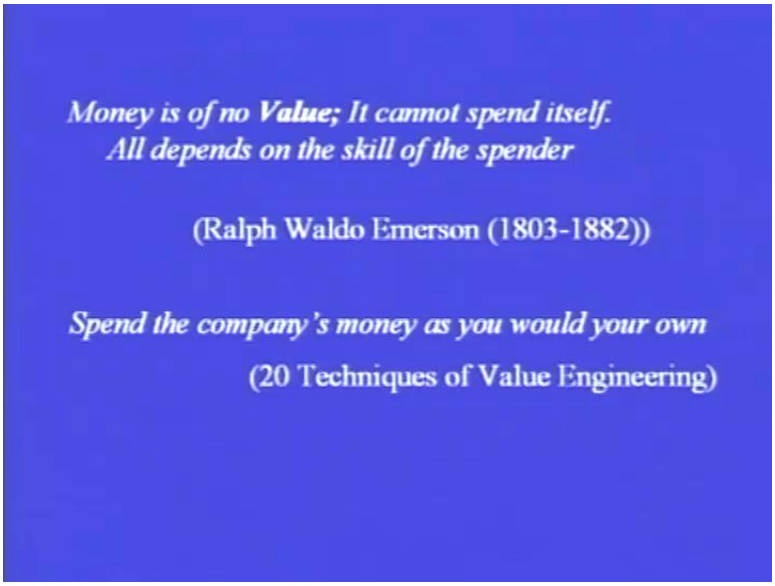

Now, we can see money if you are putting a money in a box It has no value until and unless somebody is spending is judiciously. And on the contrary for if, a person is having a huge amount of money and his spending in judiciously; the money will have no value. So, the money is of no value it cannot spend itself; Money cannot go to the market and start spending itself much depends upon the skill of the spender. Similarly, spend the company's money as you would your own. So, this is one of the techniques of Value

Engineering. There are 20 techniques of value engineering. So, one of the important is that, spend the company's money as would your own.

So, that would add value to the money. Because whenever, we are spending our money we want to see that, what is the value that we are getting for by spending this much money? What is the value of the product? That we are getting by putting this much of money. We do at detailed analysis and then only we put our money for that particular cost. Similarly, if you spend the company's money or the government's money keeping into view that, how the what value this money is going to add?

Then, the company is going to make a lot of profit. So, these are the 2 basic things related to understanding the value of money. And why money has been put here? Because, all of us are related to money. What is the basic concept? And from where did it did it or regenerate? So, already I have said that today's is are globally competitive environment. Most of the companies are getting trying to acquire as much market share as possible. They are trying to sale or an increase their sales to the maximum possible level.

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So, the important questions to answer are: How companies are able to launch a new product with upgraded quality at a lower price? So, this is the very simple question. Where, most of the companies are coming up with new and new products. But the products, but the prices are either same. Or they have been reduced and the quality has

been an enhanced. Usually, we say that if the quality is more we have to spend more money, but here if the quality has been increased.

The functionality has been increased, but the price is have been brought down. How it is possible? So, the next question comes is are these companies selling at loss? So, if these companies are reducing prices of their product they are increasing the quality of the product. So, are these companies selling at loss or are they manipulating with the quality and performance of the product? So, already we have said that trying to increase the quality the performance also is getting increased, but they are putting the price that is slightly lie lower than what was actually there.

So, these 3 questions are very relevant question in present day scenario .We see that for most of the product let us, take an example of a cell phone as soon as it is launch into the market. The rates are quite higher, but with the passage of times or rates are coming down. Why these rates are coming down? But the quality, is not manipulated the performance is not manipulated, but the prices come down. So, the answer to the last 2 questions is no. Last 2 questions are these company selling at loss? No, the companies are not selling at loss. They are still making profit.

And the second is, are they manipulating with the quality and performance of the product? The answer is again no. So, the quality is also is constant the performance is also constant and the company is also making profit. But the first question, how companies are able to launch a new product with the updated quality at a lower price? This is the basic concept of Value Engineering. That we are going to see in the subsequent slides. Now, let us come to the history of Value Engineering: how it was developed?

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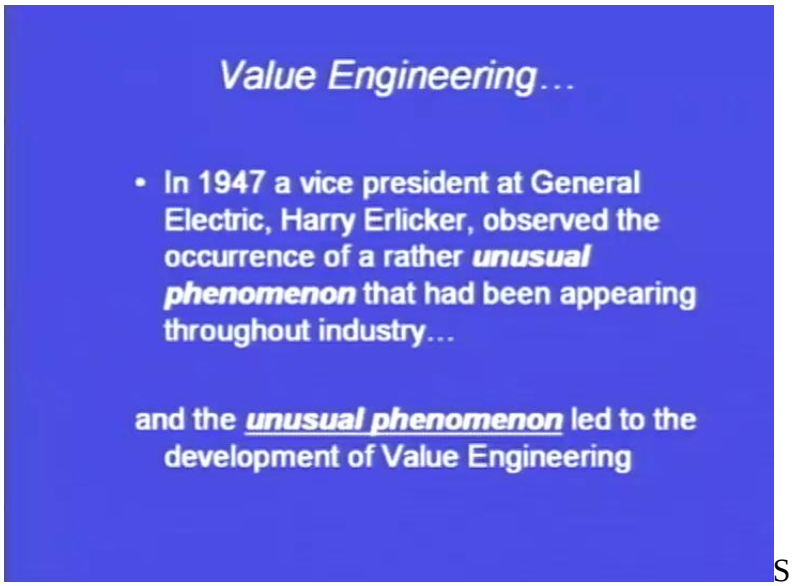

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In 1947 a vice president at General Electric, Harry Erlicker, observed the occurrence of rather unusual phenomenon that had been appearing throughout industry. So, after the world war it was see, what was this unusual phenomenon? That I am going to explain now. So, after the world war it was observed that most of the war planes most of the artillery most of the equipment that has been used in war. He has either been damaged or it is not in use or it could not be use. Because, of the damaged that has taken place due to war.

Now, this thing has to be redesigned. So, for redesigning you need to do all the calculations again, this has to be again manufactured and for manufacturing you need raw materials. Now, the raw materials of which these artillery or this equipment was initially made may not be available now. So, the materials also have or the substitute material, also have to be found out the materials have to be changed.

The design has been changed, the materials has been changed. And then these things can be repaired and this thing can be redesigned and remanufactured. So, during this process it was found out that the new equipment or the new materials that have been used for manufacturing these particular type of equipments have resulted into a product which is of relatively lower cost as compare to the older once. So, the products or the war planes or we can say the aero planes or the war ships.

That were developed designed in the beginning or before the world war they were having some cost associated with them. After, the world war when these things were redesigned and they were remanufactured using different materials, different technologies and different designs, but with the same function, same quality, same performance It was found out that the rates are considerably lower. So, it was thought of that why cannot this particular phenomenon that we have observed if translated into other engineering products .And when, it was translated into other engineering product it was found out that yes, this is something which can be applied this is universal.

This can be applied into any particular field of engineering and thereby, we would be able to save a lot of money for the organization or the company. So basically, what was the phenomenon? The phenomenon was the change in the design, the change in the material, and the change in the processing technology. But the important point to note is that we are not compromising on the quality, we are not compromising on the performance we are not compromising on the functionality.

So redesigning, remanufacturing taking into account newer and newer materials, but keeping he quality, functionality and the performance as we as well as we can say the reliability of the product same. If you are able to do these things at a relatively lower cost then we can see that we have value engineered product. And the unusual phenomenon led to the development of Value Engineering.

So, this was the basic concept the basic phenomenon that led to the development of Value Engineering as a branch of or a field of Engineering Sciences. So, I think by now all of the listeners might have got an idea that why Value Engineering was developed? And what was the phenomenon that led to the development of Value Engineering as a field of Engineering Science? What is value? Now, the Value Engineering context is made up of 2 in important words Value and Engineering.

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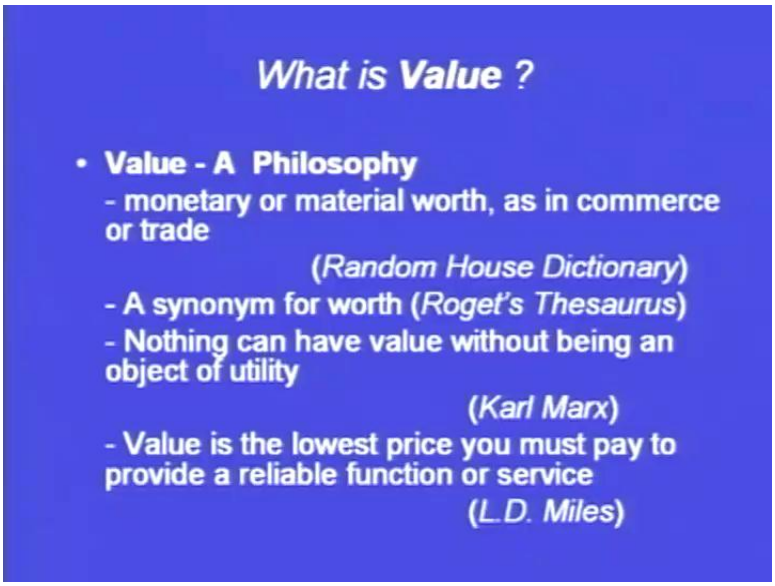

So, what is value? So, value is basically a philosophy according to the random house dictionary value is a monitoring or material worth, as in commerce or trade. Or it is a synonym for worth according to the Roget's Thesaurus nothing can have value without being and object of utility. Now, if any object is giving a some utility we can say yes, this particular thing has some value, but if it is not giving us any utility maybe we can see this having no value or this is worth less according to the second definition a synonym of worth.

So, value is basically a synonym of worth. So, value is the lowest price you must pay to provide a reliable function or service according to, the L D Miles Who is consider to be 1 of the exponents in the field of Value Engineering. So, value is the lowest price; lowest price keep in mind the lowest price. Value is the lowest price you must pay to provide a reliable function or service: so reliable function or service.

So, reliability is also coming into picture, lowest price is also coming into picture and the word function is also coming into picture. So, what other product is doing? A product is giving us some utility, a product is performing some a function and that function is being performed reliably. And we are acquiring that product to perform that function reliably at a relatively lower cost. So, the lowest cost that we have to spend for getting that reliable function is or a product that would perform that function reliably is the value.

So, value is a lowest price you must pay to provide a reliable function or service. Now, let's understand the value. Now, use verses esteem value. There are types of value: use value an esteem value. Then, there can be other types of value like: exchange value, but here we are focusing between use verses an esteem value.

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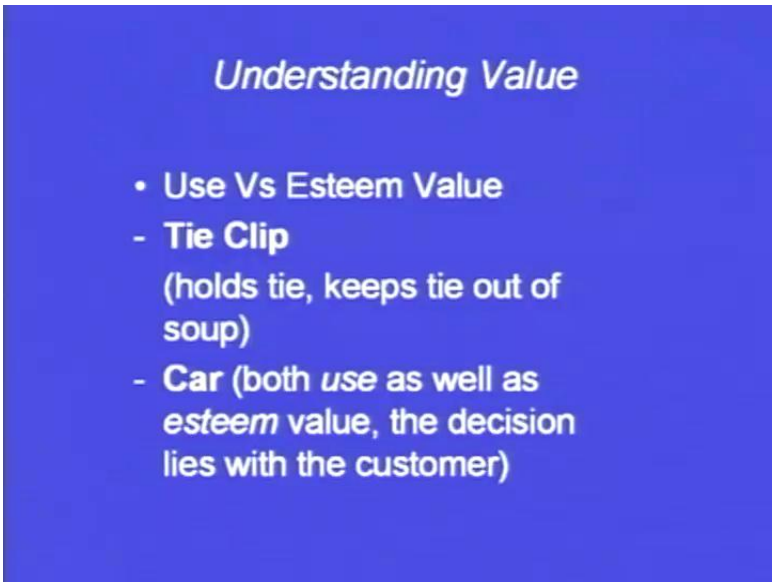

Now, let us take an example of Tie Clip. So, why are we using a Tie Clip? We are using a Tie clip in order to keep tie out of the soup .So, we are putting a Tie Clip. So, that is the tie is very close to or body and it does not fall into the soup if you have in a dinner. So, that is the use value of the Tie Clip, but there can be an esteem value of the Tie Clip also. So, if you are buying tie clip worth rupees 10 and it is performing the function reliably it is holding our tie in place we will say "yes".

It is performing the use value and it is performing the function reliably it is satisfying. So, use value is satisfied. But some people may buy a Tie Clip worth 1, 00,000 rupees or diamond studded Tie Clip. So, it is performing both the use value because, it is also holding the tie, it is preventing the tie from entering soup. But it is also providing the esteem value. Why? Because it is diamond studded. So, there is the difference between use value and an esteem, but in Value Engineering most of the time our focus is on the use value.

That the product should provide the use value our it should provide the value that is it is performing the function for which it has been designed reliably Then let us take a second

example of car both use as well as esteem value the decision lies with the customer. So, if a person is buying a car just for use value he knows that daily he has to go to his office, he will take care of the mileage, he will take into the account the sitting comfort, he will take into account that yes, a small car the parking would be simple. Then, he will his focus is basically on the use value, but if anybody wants to buy a luxury car.

Then, the focus is on esteem value. So, there is a difference between a use value as well on a esteem value, but already I have stated in that example of the Tie Clip that, in case of Value Engineering. Most of the time the focus of the Value Engineers is on the use value of the product that whether, the product or the service is providing the reliable function or not. So, that is the focus and that function has to be performed or the intended function has to be provided reliably at the minimal possible cost.

So, lowest cost essential function satisfied and the performance is also good or the performance is also reliable. That is, what the Value Engineering aims at doing? Now, another thing is I am saying function and function word again and again. So, what is the function? So, there are different types of function: it can be a primary function, it can be a secondary function.

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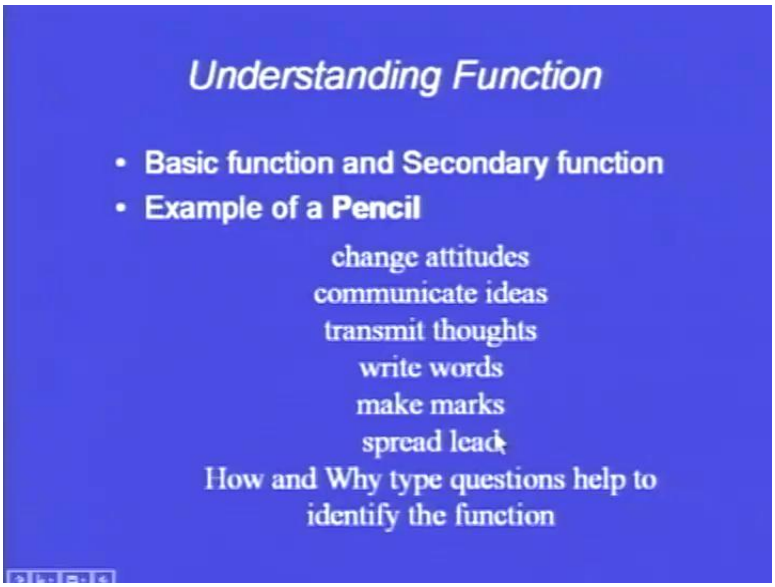

So, primary function can also be called as the basic function. So, we can have a basic function and we can have secondary function. Let us take an example of a pencil if I say that, why are we using a pencil? Most of you would answer for writing the words. But

no, pencil is having a large of other functions as well. So, how and why type of questions help us to understand the basic function of the product? So, let us take an example if I say, why do we spread lead? Why do we spread lead in order to make marks? So, basically pencil is being use to spread lead on a piece of paper.

So, those marks that we are making that can be a drawing, it can be some words, it can be sketching. So, a pen spreading the lead can be use to achieve different types of functions. So, why do we spread lead a pencil is used for spreading lead? It is not use for writing is just 1 function that, we are getting out of pencil. So, the basic function of pencil is to spread lead on a piece of paper.

So, why do we spread lead? To make marks. And why do we make marks? To write words. And why do we write words? To transmit thoughts. Why do we transmit thoughts? To communicate ideas. And why do we communicate ideas? To change attitudes. So, we are asking why type of questions at every step and we are getting into a more global domain as compare to a local domain.

So basically, a pencil basic function is to spread lead, but we can change the attitudes by a spread of lead only. Or we can ask how type of questions that, how we how can change attitudes? By communication ideas. So, how can be communicating the ideas? By transmission of thoughts. And how we can transmit thoughts? By writing words. How we can write the words the words? By making marks. And how we can make marks? By spreading lead.

So, the how and why type of questions help us to identify the function. That what is the basic function? Now let us, take another example: If we say, why do we use lighter? People would say to, the light up the cigarette or to light up the stove. But we can also say the basic function is to generate heat. And it can be used for firing it can be use for a number of other purposes also.

So, similar type of examples can be there where, we need to understand what we mean by a function? And why the product has been developed? Because, a product is such a thing that is going to perform, the function reliably at the minimal possible cost and if, we are able to achieve this particular goal we can say that we have Value Engineered the product. Why? Because, we are providing the function reliably at the minimal possible cost and we are saving a huge amount of money for the company.

So, by now we have understood what is value? What is function? And we have to provide this function to the customer at the minimal possible cost. So now what is Value Engineering? We can say some of the questions that might have come to your mind by a going through this presentation is that is it cost reduction? Because always we have been focusing on at the minimal possible cost at the minimal possible cost providing the function reliably at the minimal possible cost.

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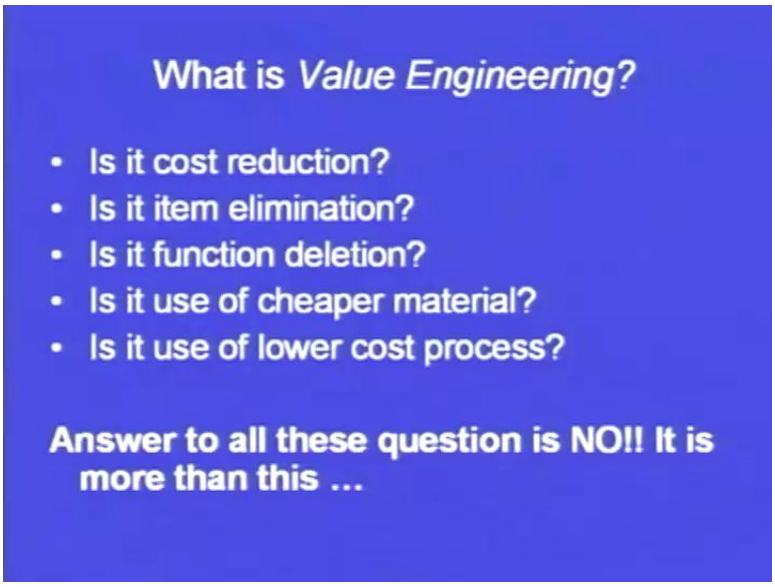

So, cost is our focus. So, is it cost reduction? Or is it item elimination? Because, we are focusing on the basic function so there may be some secondary function which we may like do delete in order to reduce the price of the product. So, is it item deletion? Or is it function deletion? Some time there, may be some function which are redundant, so we may like to delete those functions. Or is it use of cheaper materials, because we want to reduce the prices.

So, we can change the material from a very good or sophisticate or high strength material to low strength material. So, that the price of the product comes down; so is it to use of cheaper material? Or is it use of lower cost process? So initially, suppose the product is being manufactured by process x. So, are now we producing the product with process y?

So, we are we changing the process? Are we going to the process, which is cost effective or which is cheap? The answer to all these questions as you can see on your screen is no! It is more than this. So, Value Engineering is not cost reduction, it is not item deletion, it

is not function deletion, it is no use of low cost materials or process is it is much beyond that.

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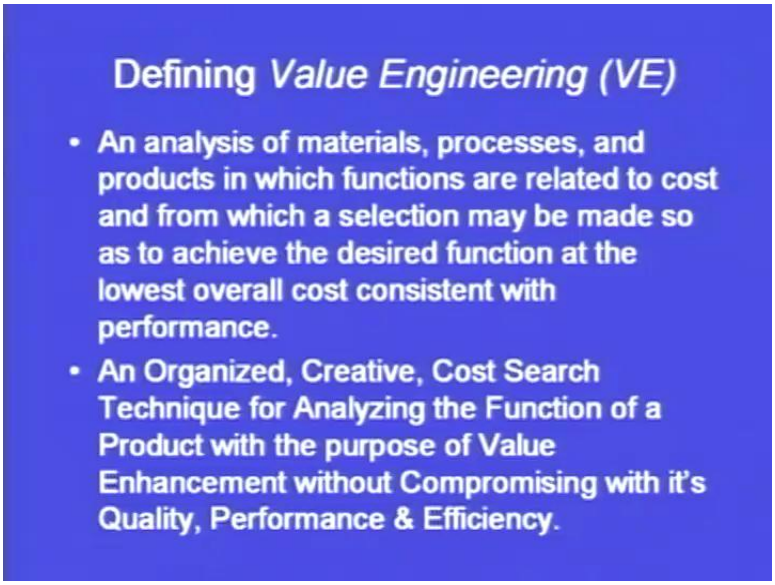

Now let us, come to the definitions or the basic understanding of the concept of Value Engineering. So, what is Value Engineering? Value Engineering is an analysis of materials processes and products In which functions are related to cost and from which a selection may be made so as to achieve the desired function at the lowest over cost consistent with performance. So, the important point to note is desired function at the lowest overall cost consistent with performance.

So, we have to achieve the function at the lowest cost and the performance also has to be kept in mind. So, we have to select the design, the materials, and the processes of the product or for the product. In such of way that we are providing the reliable function. We are providing the function at the lowest cost and reliably as well as at a very high level of performance. So, this is what we have been discussing till now, which has now been framed into a definition?

Then, it is an organized a creative, cost search technique for analyzing the function of a product with the purpose of value enhancement without compromising with it is quality performance and efficiency. So, what we are doing is? We are not compromising with the quality performance and efficiency. What we have trying to do is? We are trying to figure out that how the function can be achieved at the minimal possible cost. So, we

may have to redesign the product, we may have to use some new materials, in manufacturing of that product or we may have to identify some processes. Which are cost effective, but which do not alter the quality performance and efficiency or which do not play around with the quality performance and efficiency.

So, quality performance at and efficiency is fixed. It is not to be altered, it is not to be changed, but we are going to change the design, the manufacturing or the material. So, that we are going to achieve this particular level of quality performance and efficiency. Maximum value is obtained when essential function is achieved for minimum cost.

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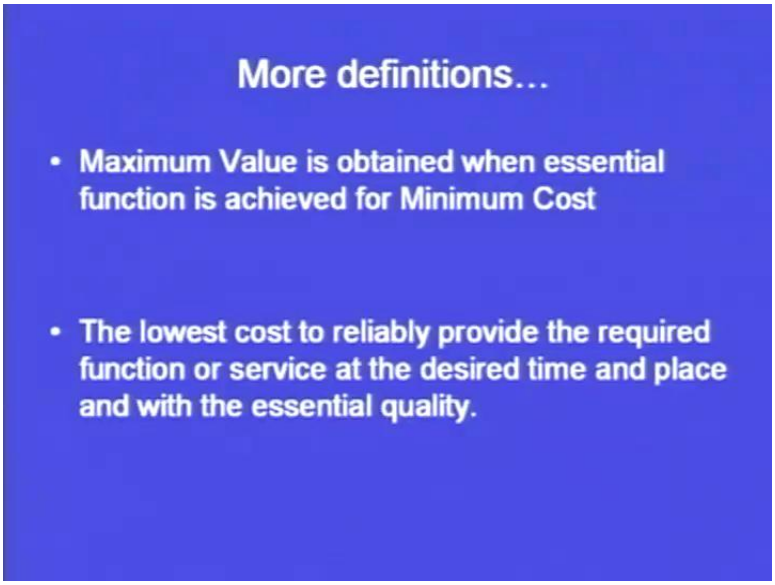

So basically, we can say that mathematically it can be related the value can be related to function and cost. So, we can say value is directly related to the functions and inversely related to the cost. So if, we are maximizing the functions the value is getting increased if the cost is constant. So, we can say value is directly related to the functionality of the product and it is inversely related to the cost of the product.

So if, cost is constant we are increasing the functionality the value is getting increased. If the functions are constant we are able to reduce the cost then also the value of the product is going to increase. So, maximum value is obtained when essential function is achieved for minimum cost. So, maximizing the functionality minimizing the cost would add value to the products. So, which is given in this one line definition only? That maximum value is obtained when essential function is achieved for minimum cost. Also

there is another definition which states: that lowest cost to reliably provide the required function or service at the desired time and place and with the essential quality. So, the quality is not compromised at desired time and place the function or the particular use is getting satisfied.

So, function or service has been provided at the lowest cost and at the desire time and place. We can say yes! it is a with definition of value of the lowest cost to reliably provide the required function of service at the desired time and place and with the essential quality, So, what we are discussing till now? We have see, so many different definitions or by different authors we have found out. That yes, Value Engineering is nothing, but providing the function reliably at the lowest overall cost.

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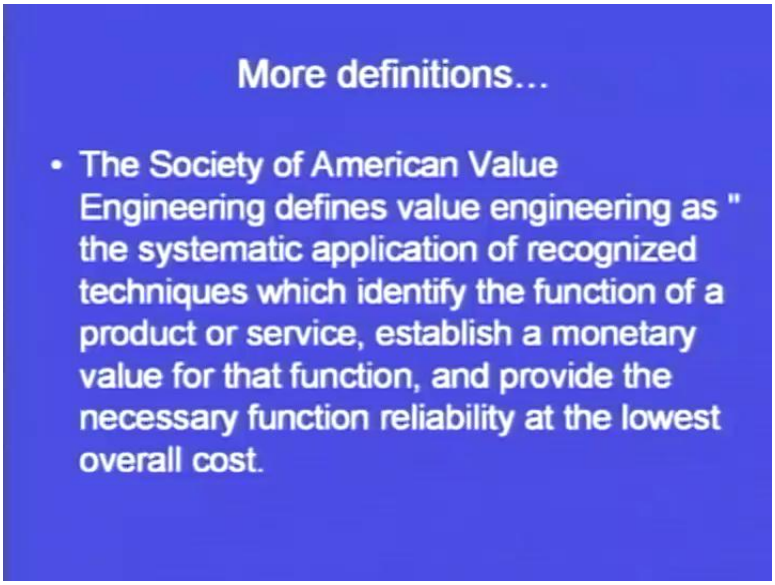

The society of American Value Engineering defines Value Engineering as "The systematic application of recognized techniques. So, the approach is very systematic it is not haphazard recognized techniques are used which has already designed and already are in place which identify the function of a product or service". How by asking how and why type questions.

There are other techniques also to get into the functionality of the product, to understand the functions of the product to understand the basic and secondary functions of the product. Establish a monitory value for that function and provide the necessary function reliably at the lowest overall cost. So, very easily we can say that it is a systematic

approach, it is a recognized approach, different tools and techniques have been developed to understand the function.

And then we have to provide this function reliably at the lowest overall cost. So, how it is defined? If we some rise the definitions. What is it? That we have already seen the definitions. What does it do? At achieves the required function at the lowest cost. What does it cost? At least break even is certain if we run a Value Engineering program in our organization.

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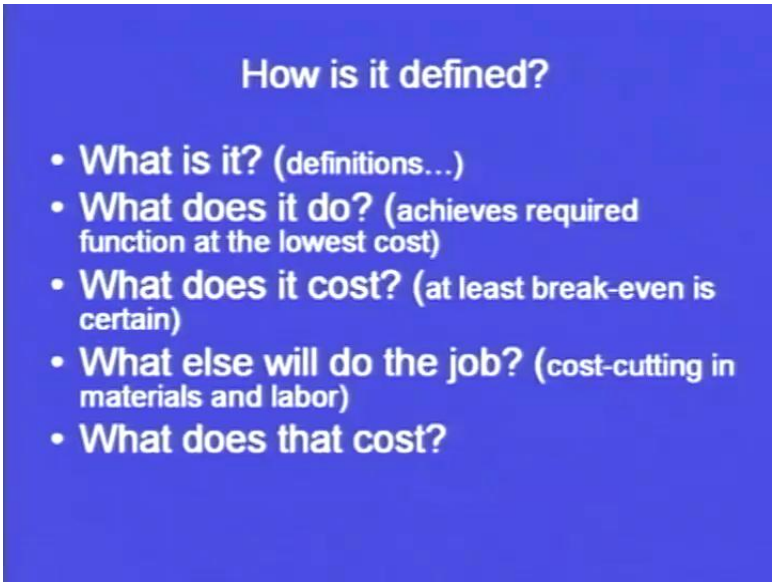

It is certain that the money that we spend we are going to get back that money in one form or the other. So, the potential savings are: either equal to the money that we have spend or are even more than the money; that we invest into running a value engineering program. So, at least break even is certain. What else will do the job? So, if Value Engineering cannot do that. So, what else do can do? So, cost cutting in materials and labor can be done, but are cost cutting measures not hind not we can say, playing around with the quality and the performance and the efficiency of the product?

So, cost cutting may play around with the quality efficiency and performance of the product and that is go we do not want. So, what does that cost? So, if we are going for cost cutting. What does that cost? So, what is the cost involved in running up cost cutting program? So basically, we need to understand that Value Engineering is something which provides the function at the minimum cost and at least, if we run the program we

are certain that we are going to get some benefits. And how it is different from cost cutting? That we are going to see also Miles who has been considered as an exponent of Value Engineering.

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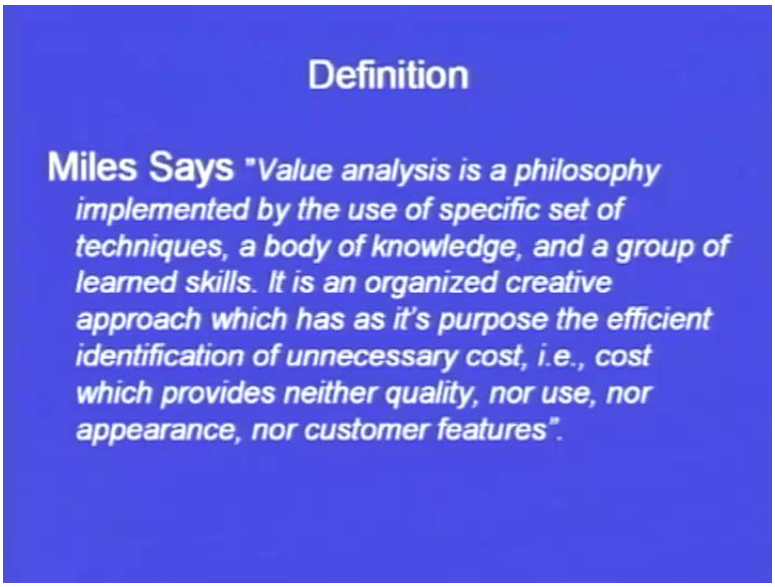

He has said that "value engineering or value analysis is a philosophy implemented by the use of specific set of techniques, a body of knowledge, and a group of learned skills. So, already learned skills have been developed which can be put to use, It is an organized creative approach which has as its purpose. Now, what does these 2? The efficient identification of unnecessary cost that is cost which provides neither quality, nor use, nor appearance, nor customer features".

So basically, we are trying to identify those areas which are not providing any customer satisfaction. And these are definitely related to addition of the cost in the product. So, they are contributing to the cost, but they are not contributing to the functionality so such type of areas we have to identify with the help of recognize tools and techniques recognize procedures.

And then you have to attack these areas in order to increase the value of our product by minimizing the cost for acquiring that product or service. Let's, take an example: now this example is often hypothetical bolt that holds the wing of a transport airplane.

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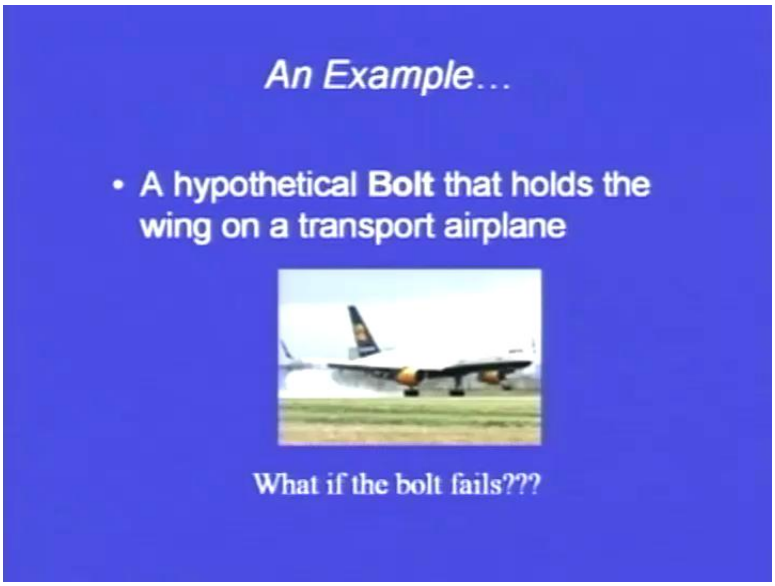

Now, suppose in this plane there are 200 passengers were traveling from point x to point y. And in between the bolt that is holding the wing fails. What is the value of the bolt? Most of you might be saying that the value of the bolt is according to the life's of the people who have lost their life's. Or it is the summation of all the damage that has been done in terms human life as well as in terms of the infrastructure lost.

Or in terms of that damages to the aeroplane, but no... The value of that bolt is 0.why? Because, the bolt was designed, the material was selected, it was manufactured, to provide the function reliably it had to perform a function of holding the wing of the passenger aeroplane, but it is not performing its function reliably. And if it is not performing its function reliably; the value of the bolt we can say is 0.

So, with this example we can very easily try to understand that, what do you mean by value? So, value is nothing, but a function is proving performed reliably at the minimal possible cost. Now, let's some people still might be having some doubts in their minds related to the difference between the Value Engineering verses Cost Cutting. So, let us see now what is the basic difference? What is what does Value Engineering do? And what does Cost Cutting do?

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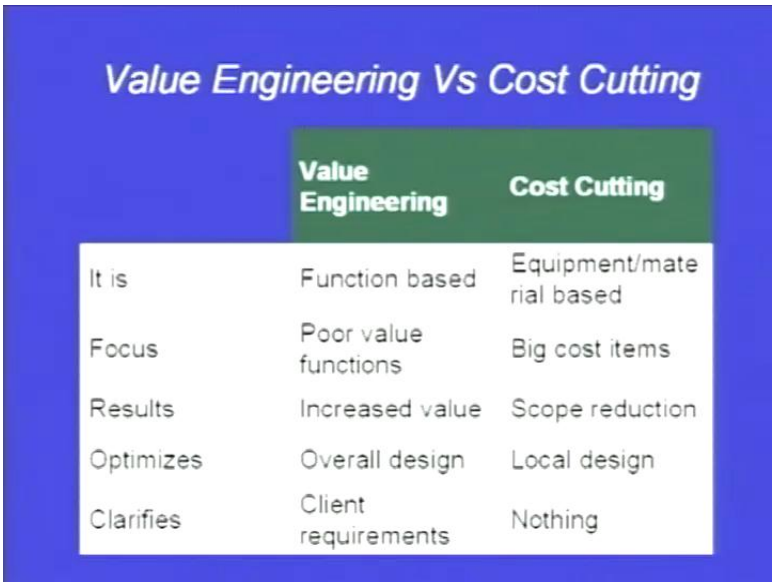

So, in Value Engineering it is function based. So, we have been discussing till now function, functionality. And what are the functions we need to maximize the functions at the lowest overall cost? So basically, the focus of Value Engineering is on achieving the function at the minimal cost, but in Cost Cutting our focus is on equipment or material. It is material or the equipment based in Cost Cutting will see yes, this product is there we have to reduce the cost. So, can we change the material? Or can we change the equipment?

So, the focus is basically on materials, but in case of Value Engineering the focus is on function. In Value Engineering we focus on poor value functions so there may be some functions which are not adding value to the product. In Cost Cutting we focus on big cost items. So, we have been discussing that the focus of Value Engineering is on poor value functions whereas, the focus of cost cutting is on big cost items. So, Value Engineering basically it results into increased value of the product.

So, what do you mean? That the function is getting the number of functions is getting increase, the cost is getting reduced and the value of the product is increasing. But in case of Cost Cutting because, we are using low cost materials, we are using low cost processes, the we are deleting some functions, we are deleting some we can say equipment or some parts or some subassembly. So, it results into reduction of the scope.

So basically, in other words we can say in Cost Cutting we are compromising with the quality performance and efficiency of the product. Whereas, in Value Engineering we are a increasing the value of the product, because we have already said that the constant thing is the quality performance and efficiency. That we are not compromising it is constant, but we are playing around with the design the materials in such of way that we are trying to increase the value of the product

So, we can say that the Value Engineering it optimizes the overall design. So, the complete design may be changed whereas, in Cost Cutting we already have fixed the design. Now, that fixed design we are trying to manufacture at the minimal possible cost. So, here in Value Engineering we are focusing on the function. For example: if we have to transport some material from point x to point y.

In Cost Cutting the tool used to transport this material is fixed. Now, we are trying to play around with that tool. How we can reduce the cost of the tool? But in case of Value Engineering What we are trying to find out is? That how to transport this material from this place this place? And if we can redesign that tool or we can find out some other way of doing this thing, we would be able to save a lot of money and we would be able to provide value service.

So, the focus is not only equipment and materials in case of Value Engineering it on the functions. So, it optimizes the overall design. So, the overall design of the product can be manipulated or changed in order to provide the function reliably at the minimal possible cost, but in cost cutting the design etcetera is fixed, but we are manipulating the materials the processes in order to reduce the cost.

So, Value Engineering clarifies finally, the client requirements where as Cost Cutting does nothing so basically, we are specifying we are working according to the clients requirements that client wants this function. We have to provide this function: reliably, satisfactorily, at a desired performance level and with the desired quality, but at the minimal possible cost. So, by now I thing all of you might have understood the difference between Value Engineering and Cost Cutting. And the next slide would further, make the difference very clear. So, Value Engineering approach attempts to find the lowest cost way to perform the desired function rather, than the lowest cost way of producing the product.

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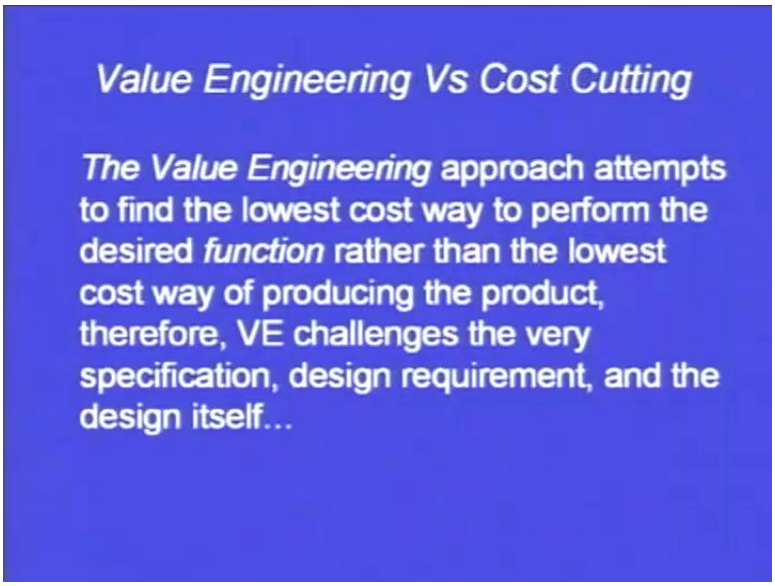

Therefore value Engineering challenges the very specification, design requirement and the design itself. So, Value Engineering basically is focusing on the design in order to provide the function at the minimal possible cost. Whereas, Cost Cutting always focus on the manufacturing the product with the minimal possible cost by altering the materials, by altering the processes.

So, that the cost is reduced which in turn a lead to compromising the quality and the performance of the products. So, by now I think it is very clear that Value Engineering is substantial different form Cost Cutting. So let us now come to the Value Engineering Cycle. So, this is a Value Engineering Cycle. How we put value engineering into practice?

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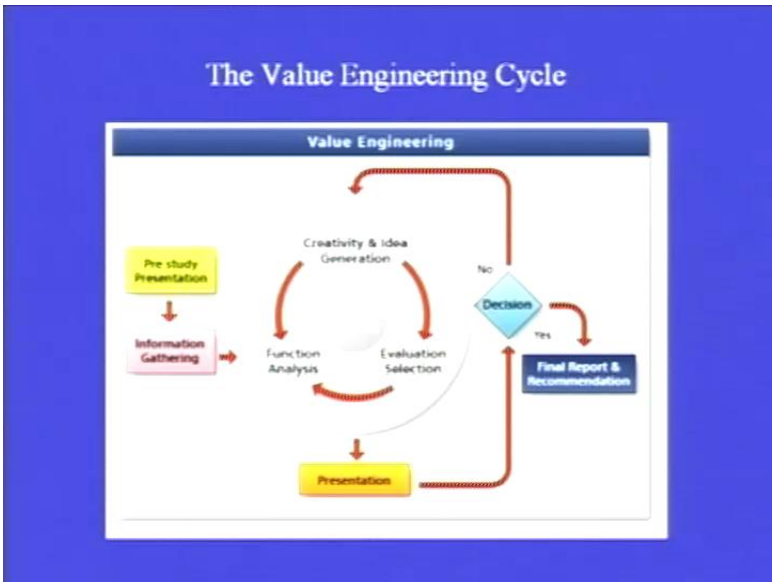

So, there is a Pre study Presentation we tried to identify the goal, we tried to find out that yes. What is the goal? What is the objective? What we are going to do? So, we have a Pre study Presentation. Then we have the Information Gathering phase. In information gathering we know this is the objective that we want to attain. For example we want to reduce the weight of the aero aircraft of the weight of aeroplane.

So, that is our objective. So, know we would to try to gather the information. That which materials should be used in order to reduce the weight? So, we are gathering the information and how these materials can be processed? What are the limitations of these material? What are the advantages of these materials? How we can reduce the weight of the aeroplane? What are the unnecessary functions?

Which are not providing any value? So, first phase is the Pre study Phase, second 1 is: the information gathering phase related to the goal, which we have already establish and then we go for creativity and idea generation. We will try to find out that how innovative we can be? How a creative we can be? How we can generate the ideas in order to achieve the function?

Then, evaluation and selection of the ideas. So, we will find out that yes, which idea is best, which is not best. And then we will do the functional analysis. So, these 3 would be working in a cycle. There are ideas we will evaluating them, we will do whether, it is satisfying the function reliably or not? And then we will have if it is satisfies yes, if it

satisfy if it does not satisfy then no, again. We will generates some more ideas so this cycle would continue. So, innovative, creativeness is 1 of the most important ingredients of Value Engineering. We have to come up with new and new solutions to the problem. So that, we are able to get the function, but at lower cost. So, this cycle would continue and if yes, then we will make a presentation. There would be a decision whether the idea or the we can say the solution or the answer that we have got is justified it is feasible.

If, it is feasible the final report and presentation would be done or final report and recommendation would be done. If, it is not correct or the decision is in negative. Then, again we will go to this cycle again, we will have some more ideas we will evaluate the ideas we will do the functional analysis and then we will make a presentation. So, basic principle is same.

But in Value Engineering we have idea, we get the information, we do some creative thinking, we do some innovative thinking, we generate a lot of ideas. Then, we evaluate and select the ideas. Thereby, we do the function analysis there are number of techniques do the function analysis, which we cannot cover in this particular lecture, but certainly they recognize tool and techniques which would help us to do the function analysis. And thereby we will make a decision that whether, yes or no.

If yes then we will go we are going to go ahead with an implementation of that particular idea. If no then further this thing would be carried out. So, this is the very simple, very systematic, method of an application of a Value Engineering. Now, let us come to another important point, where some people say that yes, we do not want to go into value engineering or they are in a dilemma to be or not be in value engineering. So, what do they say?

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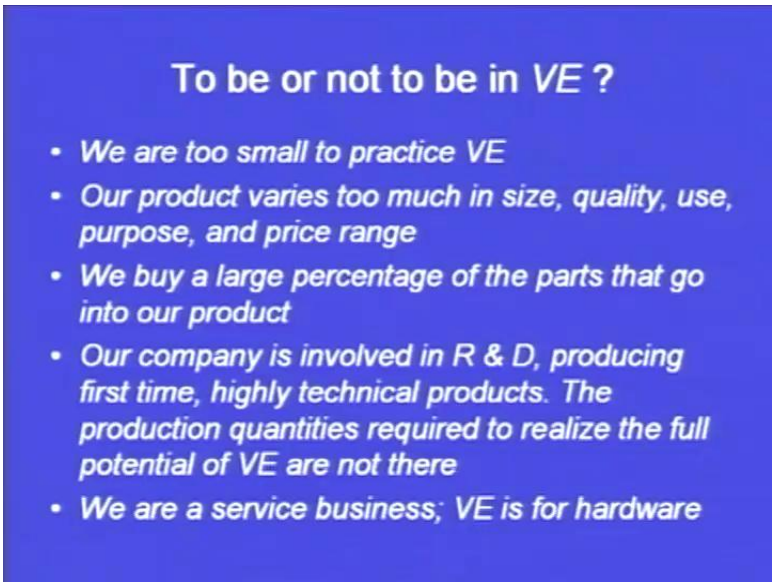

We are too small enterprise to practice Value Engineering. That our size is small our company is very small. So, we do not want to practice Value Engineering Some people say our product where is too much in size, quality, use, purpose and price range. So, we have a wide verity of products that is why we do not want to go into Value Engineering. Some people say "we buy a large percentage of the parts that go into our product".

So, ours is basically assembly organization we ours a line organization in which we are assembling the parts. So, we buy a large percentage of the parts that go into a product so we do not need Value Engineering some people say "our company is involve in research and development" So, we are producing first time, highly technical products. The production quantities are required to realize the full potential of VE are not there.

So, they are saying that "ok, our quantity is less". So, full potential cannot be explode if we go for Value Engineering, Some people say "we are in service business; we have our service sector company". So, VE is for hardware. So, they have this notion that Value Engineering this 1 hardware, but mind you all these points has been proved otherwise.

In all these sectors wherever, Value Engineering has been applied wherever, Value Engineering has been used it has been found to be successful. The tools and techniques of Value Engineering have given benefits to all these sectors of business. So, they are myths that surround the use of Value Engineering or the application of Value Engineering have been completely blown away.

Now, when to apply Value Engineering? We have seen that yes, some myths are there, but these myths are not true. So the, we have to apply Value Engineering. So, when should we apply Value Engineering? So, in this on y axis there are dollars or the money on x axis we have the life cycle phase.

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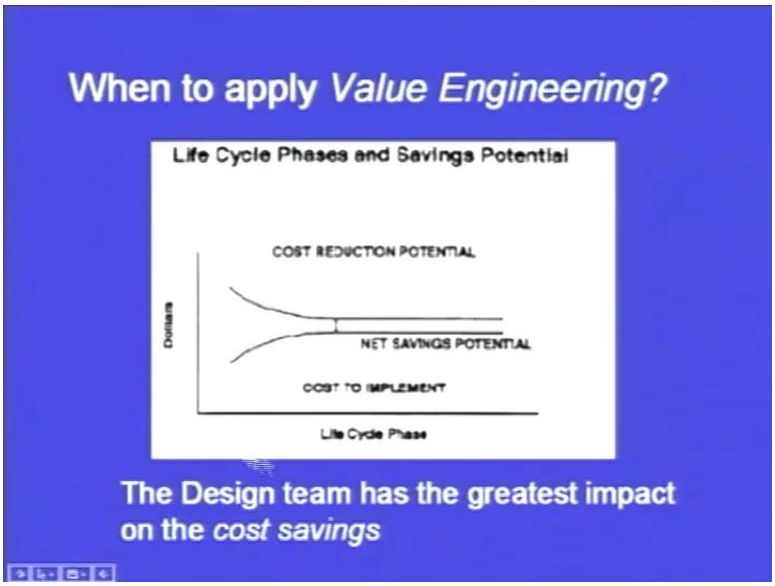

This is something the showing the net saving potential. So, cost to implement the changes will keep on increasing. This is cost to implement changes and this is a Cost Reduction Potential. So, Cost Reduction Potential is very large in the beginning and in it is very small towards the end. In the Life Cycle Phase if you see. So, at very beginning we have the potential to save the money, but if we apply Value Engineering at the later stage where the product has been already finalize the design has been finalized it is into manufacturing.

Then, what we have doing? We have not focusing on Value Engineering our focus has been shifted from Value Engineering to Cost Cutting. Although, Value Engineering can also be applied to manufacturing industry or wherever the manufacturing is taking place, but maximum benefits can be derived, if we use Value Engineering at the design stage itself.

So, the Cost Reduction Potential decreases with the Life Cycle of the product or the Life Cycle Phase of the product. So, the design team has the greatest impact on the cost saving. So, value engineering should always be applied at the design stage only.

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What are the application areas? This can be used on new plants or some revamps: that are taking place it clarifies the scope, encourages focus on poor value, encourages alternatives, basis for cost reduction. So, it acts as a base for cost reduction or it can be used for existing plants, it can be used new plants or for the existing plant also. Highlights poor value of operations, encourages alternative operations and compares cost of operation with benefits.

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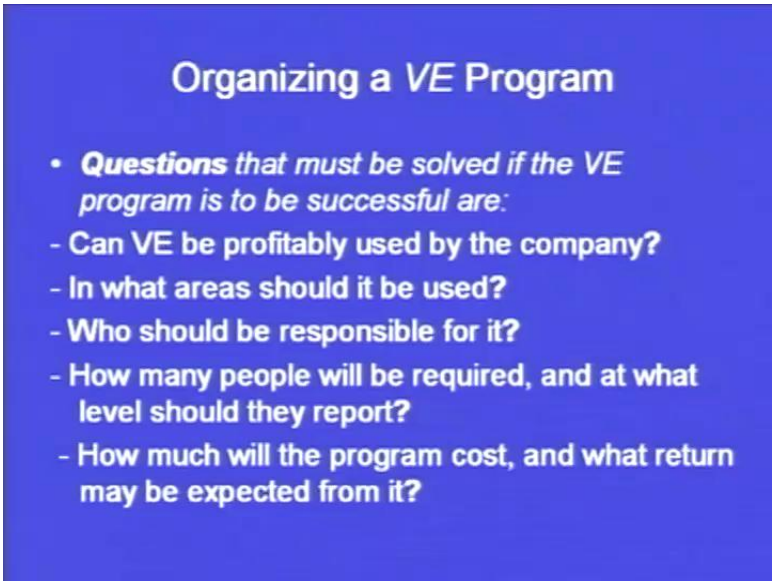

Now, let's come to the practice part of Value Engineering. We have till now understood the theoretical or the theory related to the basic concepts Value Engineering. Now, we come on to organizing the Value Engineering Program. So, this is very simple I will just read it out for you. Questions that, must be solved if the Value Engineering Program is to be successful are: So, we want to run a successful Value Engineering Program.

Can value engineering be profitably used by the company? In what area should it be used? Who should be responsible for it? How many people would be required and at what level they should report? How much will be the program cost and what returns may be expected from it? So, if you are able to answer all these questions at the very beginning we can run a successful Value Engineering Program.

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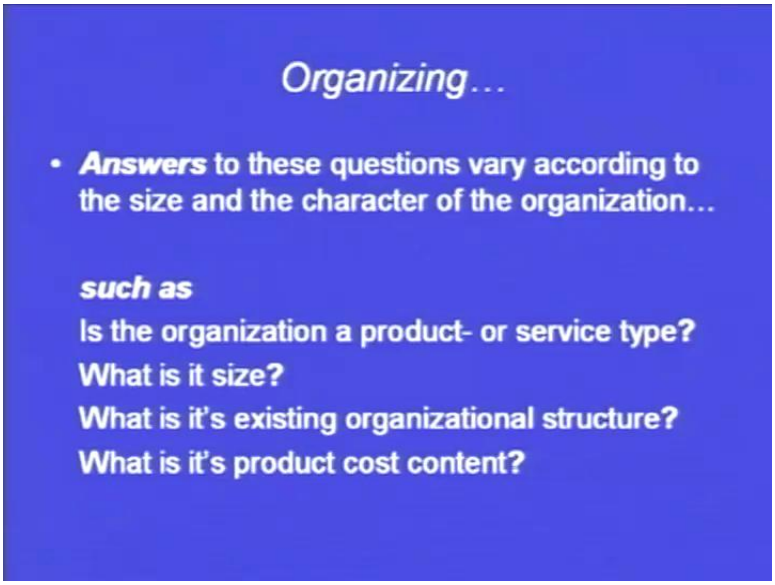

Answers to these questions vary according to the size and the character of the organization. So, the answers to the questions that were there on the last slide are very specific. And these are specific to the type of organization and the character of the organizations. Such as, is the organization product or service type? So, if the organization is product type's answers to the question would be different.

If, the organization is service type the answers would be different. Similarly, what is the size of the organization? If, it is the multinational company the different the answers would be different. If, it is very small company the answers may be different. What is the existing organizational structure? What's the product cost content?

So, depending upon the company's organizational structure or the company's policies the answers to the successful implementation of Value Engineering questions may be different. So, once we have answered all those questions on the basis of our organizational structure or on the basis of our organizational policies. We can further, move ahead into running a successful Value Engineering Program.

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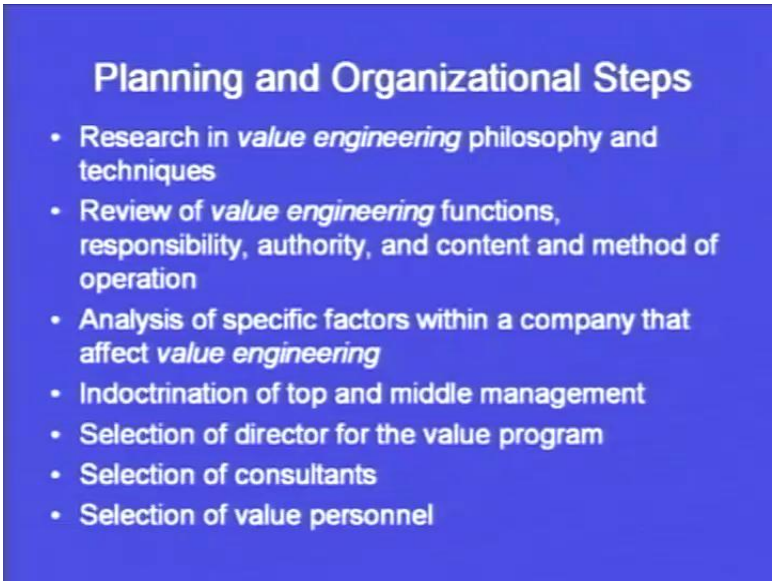

First thing and the foremost thing is the planning and organizational steps: So, what are these? Research in Value Engineering philosophy and techniques. So, first thing is we need to understand what do what is Value Engineering? We need to understand some case studies related to successful implementation of Value Engineering. Review of the value engineering functions, responsibility, authority and content as well as method of operation.

Analysis of specific factors within a company that affect Value Engineering. So, there are number of factors within the organization which may be a affecting the Value Engineering Program. So, we have to analyze those factors: Indoctrination of top middle management, Selection of director for the value engineering program, Selection of consultants, Selection of value personnel. So, we have to select that who are the people who are going to be involved in the successful running of the Value Engineering Program?

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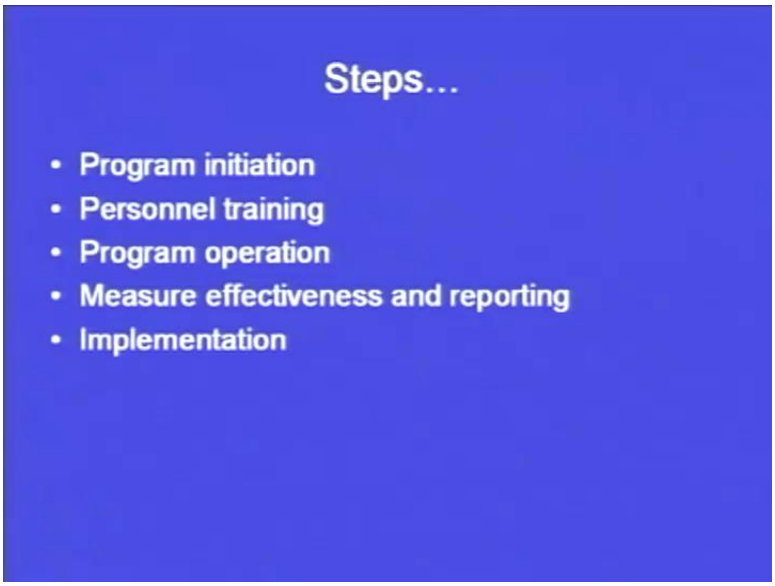

What are the various steps? So, the various steps involved are: program initiation, Personnel training, Program operation, Measure effectiveness and reporting. So, first is thing are the planning stages, then the execution stages and then the control stages in which, we are measuring the effectiveness and reporting, and finally the implementation. Now, research in VE basic knowledge what is VE?

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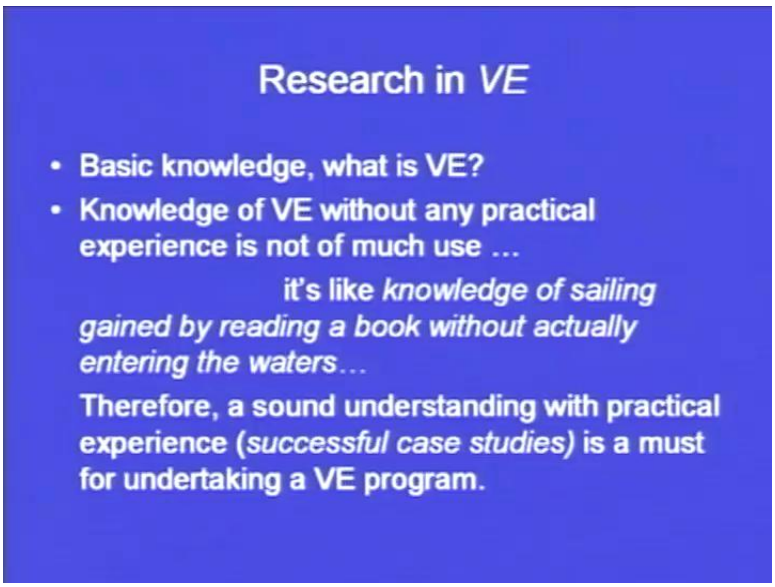

By now if we have heard the lecture very carefully you might have got the basic idea that what you mean by Value Engineering?

Knowledge of Value Engineering without any practical experience is not of much use. So, practical experience is very important successful knowledge of the successful case studies. We need to have a knowledge of the areas where it has been applied. How it has been applied? And what success has been achieved by the implementation of Value Engineering? We need to have all that knowledge we thus.

If, we want to run a Value Engineering Program. So, knowledge of Value Engineering without any practical experience is not of much use. So, it is like knowledge of sailing gained by reading a book without actually entering the water. So, without actually entering into the waters if we have some knowledge related to a theoretical knowledge that we have got from the book we will not become a good seller. In order to become a good seller we have to actually enter into water.

So, we need to have a practical experience instead of a theoretical experience. So, here what we are having is a theoretical experience? What we are to trying to understand is? A basic integrities of the Value Engineering Process, but in order to have actual implementation. We have to enter into the finally, into the program or finally, into the practical situations. Therefore, a sound understanding with practical experience successful case studies is a must for understanding a Value Engineering Program.

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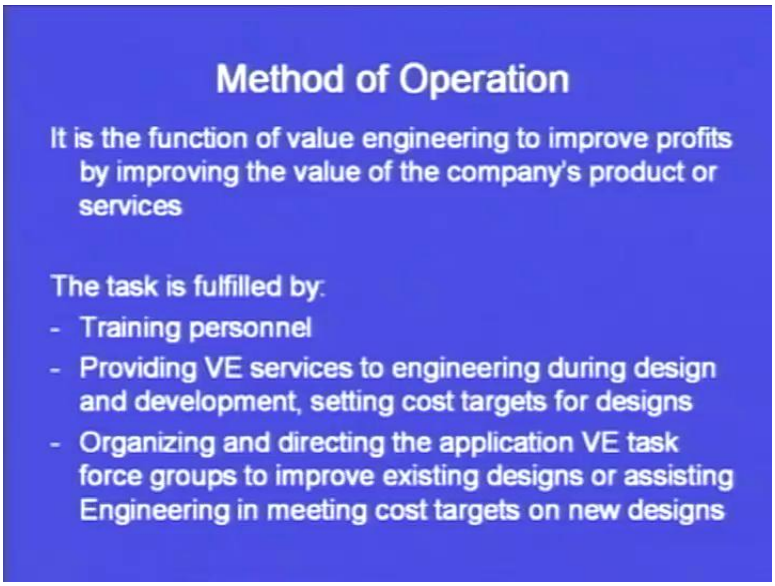

So, this is what? I have been saying 1 number of times. So, what is a method of lateral operation? It is the function of Value Engineering to improve profits by improving the

value of the company's product or services. The task is fulfilled by training personnel, providing Value Engineering services to engineering during design and development, setting cost targets for designs. Organizing and directing the application of value engineering task force groups to improve existing designs or assisting Engineering in meeting cost targets or new designs.

So, there would be some people who would be having the knowledge theoretical as well as practical of the Value engineering Program? And these people would now, help the other people the design people the manufacturing people in order to apply these techniques in order to meet the cost targets.

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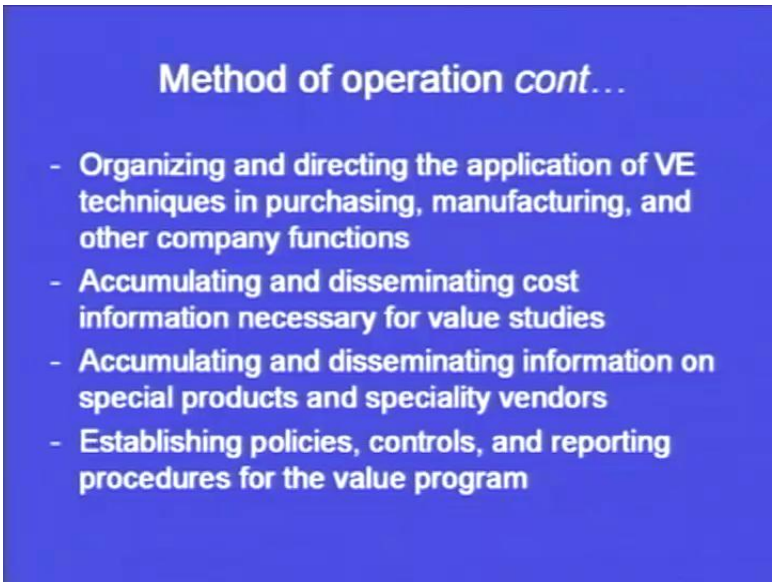

Method of operation: Organizing and directing the application of Value Engineering techniques in purchasing, manufacturing and other functions. Accumulating and disseminating cost information necessary for value studies. Accumulating and disseminating information of special products and specialty vendors. Establishing policies, controls and reporting procedures for the value program.

So, this is the way how we are going to implement a program? Or how we are going to run a program? Now, we have to think of the size and physical location. Question is: whether to have a centralized or a decentralized value engineering task force?

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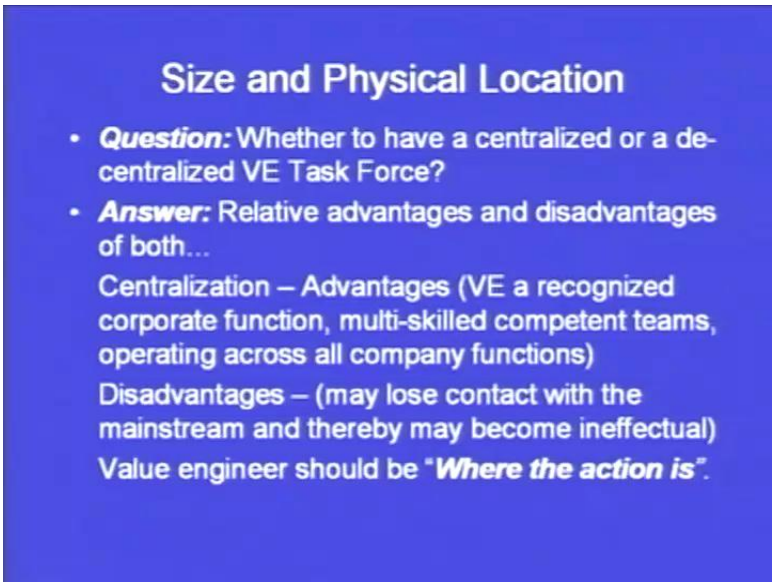

Answer is: relative advantages of both. If, we have a centralized value engineering task force there are some advantage and limitations. If we have decentralized also there are pros and cons. So centralization; so what are the advantages of a Centralized Value Engineering task force? VE is recognized as corporate function, multi-skilled competent teams, can be formed and these can be operating across all company function.

So, Value Engineering is adopted as a company policy. So, what are the disadvantages? May lose contact with the mainstream and thereby may become ineffectual. So, if the Value Engineering task force of the people involved in Value Engineering are sitting at the corporate office. They may lose contact with the people who are actually designing and manufacturing the product on the shop floor or in the plant.

So, corporate house loses contact with the actual plant. So, Value Engineering engineer should be where the action is, so it is a thumb rule. That Value Engineer should be placed where the actual action is taking place. Furthermore, Indoctrination of top and middle management, the value engineer or manager

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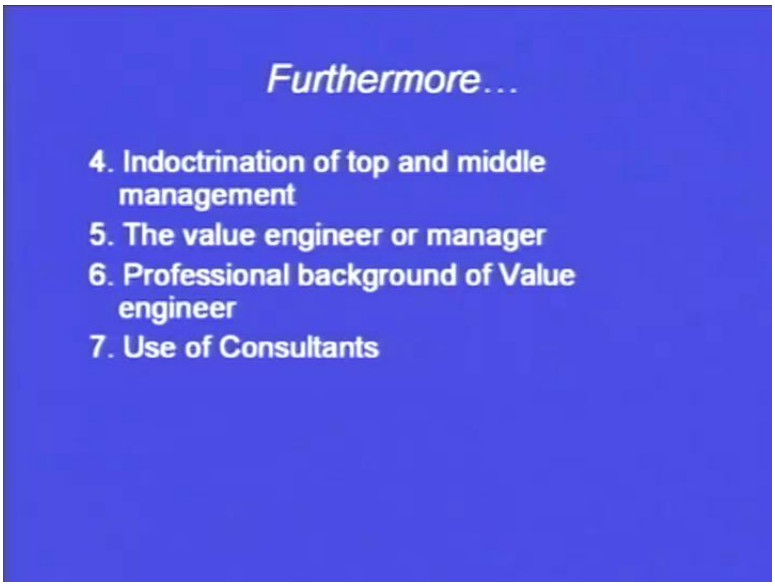

So, whether we should I have engineer or a manager that is also question that has to be answered, then Proportional background of value engineer. What should be the educational qualifications of the value engineer also the Use of Consultants. Sometimes we may not have the proper expertise available with us. In that case we have to use of we have to go for use of consultants.

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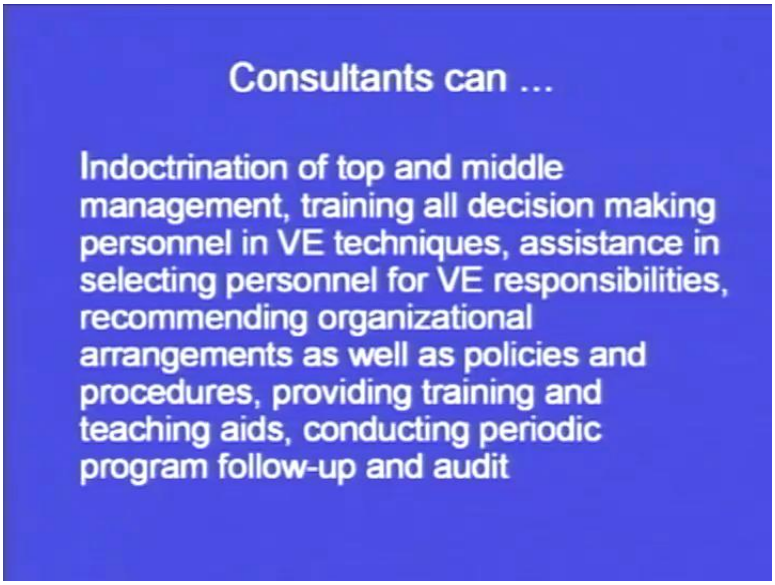

So, what this consultants are going to do? So, these consultants are going to result into indoctrination of top and middle management, training all decision making personnel in

Value Engineering techniques. Assistance in selecting personnel for Value Engineering responsibilities, recommending organizational arrangements as well as policies and procedures, providing training and teaching aids, conducting periodic program follow-up and audit. So, if we hire the consultants they are going to do all these important function. So, basic function of hiring the consultant is that they are going to train our manpower going to train our people who are going to take decisions related to Value Engineering.

They are also, going to frame some procedures and policies which are going to help us in the successful implementation of the Value Engineering Program. Now, when the program initiation takes place? Where will it be placed in the organization to whom it will report? Who will head it up? Will it be staff or line function? Will it be centralized or decentralized? How many members will be needed? How will it function?

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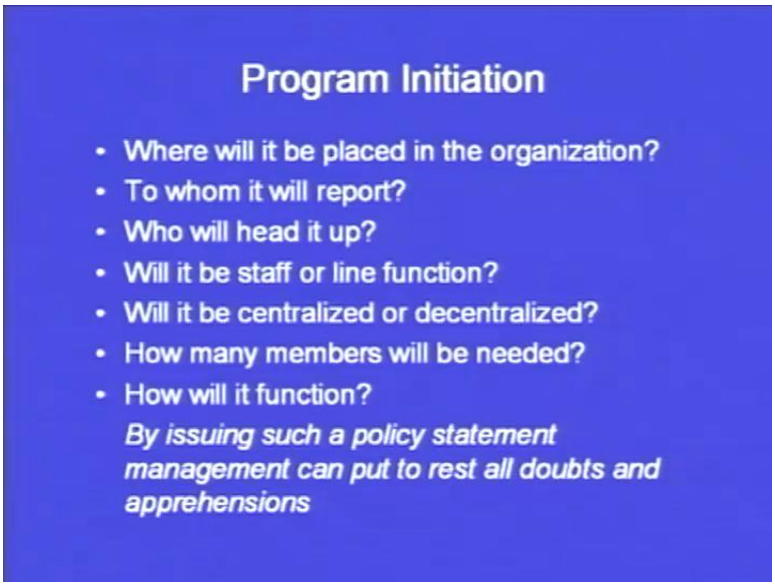

So, we need to answer all these questions when we are going to start our Value Engineering Program by issuing such a policy statement management can put to rest all doubts and apprehensions. Suppose, the company decides to go for the adopting Value Engineering Principle, Many people will have all these doubts that who would be the head? Who would take care of it? Who is going to report?

So, where will it be placed? How many people would be required? So, if you have a policy document answering all these questions, all the doubts would be set to rest. And

finally, formal training programs can be conduct it we will be selection the people. Who are going to work for Value Engineering?

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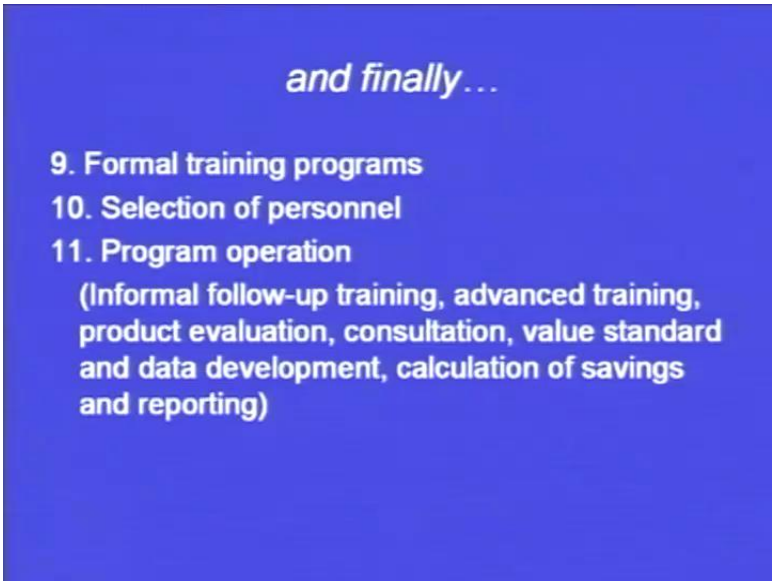

The program operation would be there in which will have a informal follow-up training. Advanced training can be done, product evaluation can be done, and consultation can be there, value standard and data development can be there, calculation of savings and finally, the reporting. So, in today's lecture we have seen that what is the basic concept? Or what is the theory related to Value Engineering?

What do we mean by value? What do we mean by function? How can we get the basic and the secondary function of a product or service? Then, we have seen that if you want to apply Value Engineering. When should we apply? And then we have seen a very simple procedure for adopting a Value Engineering Program. Wherever, we have seen that whether it should be centralized, whether it should be decentralize. How many people should be there? What level they should report? So, the answers to these questions, if they are got by the organization with the help of the consultants who are experts in the field of Value Engineering, then Value Engineering can be applied successfully by the companies for making huge profits.

Thank you.